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EXAMINER	
CHEN, WENPENG	
ART UNIT	**PAPER NUMBER**
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/631,884	TAUBMAN, DAVID S.	
	Examiner	Art Unit	
	Wenpeng Chen	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/29/2003*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

Examiner's Remarks

1. Applicant's arguments with regard to rejections in the parent applications (US application 09/527,758, now issued as US patent 6,658,159) have been considered, but not persuasive. Basically, the Applicant argued that the rejection based on the combination of the admitted prior art (pages 2-3, last paragraph in page 7), Schwartz et al. (US patent 5,815,097) and Budge et al. (US Patent Application Publication 2002/0080408) is improper because the portions of Schwartz that the Examiner relied on teach predictive coding not bit-plane coding. In the office action presented in the parent application, the rejection was not based on substituting bit-plane coding taught by the admitted prior art with Schwartz's predictive coding. The Examiner likes to point out that the concepts that leads to the combination used in the parent application and rejection below are (1) any portion of data that has uniform statistical distribution, namely random among the data, can bypass an arithmetic coding as taught by Schwartz and (2) least significant bits of a set of data are usually random in their probability of occurrence taught by Budge. Therefore, it would be obviously for one of ordinary skill in the art, at the time of the invention to apply the combined teachings to bypass an arithmetic coding for the least-significant-bit bit-planes taught in the admitted prior art.

Claim Objections

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims

are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

The second Claim 5 is objected to because it appears after Claim 9. The second claim 5 shall be renumbered as Claim 10.

Claim Interpretation

3. For subsequent examination, the second claim 5 is renumbered as Claim 10.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-10 and 12-18 are rejected under 35 U.S.C. 102(a) as being anticipated by "JPEG 2000 IMAGE CODING SYSTEM," JPEG 2000 Final committee draft version 1.0, **16 March 2000**, hereafter referred as JPEG 2000.)

a. With regard to Claims 1-10, JPEG 2000 teaches method for compressing image data, comprising the steps/components for:

-- decomposing the image data into code-blocks of coefficients using a transform, each code-block comprising a plurality of bit-planes from a most significant bit-plane to a least significant bit-plane; (sections 6.3 and 7, pages 9-11; sections B.6 and B.7, pages 60-61; annex D)

-- forming an encoded bit-stream by coding bit-planes of coefficient data in the code-blocks according to an arithmetic coding scheme in order to form an encoded bit-stream; (annex D, page 93)

-- wherein coefficient data from at least one bit-plane is included in the encoded bit-stream without arithmetic coding; (annex D; page 93; Section D.6 including pages 100-102 teaches that data associated with significant pass and magnitude refinement passes higher than fifth significant bit plane are not arithmetically coded. Raw bits are sent directly.)

-- wherein the arithmetic coding scheme operates in a plurality of coding passes, and wherein at least one of the arithmetic coding passes for the coefficient data from said at least one bit-plane is not performed during the image data compression; (annex D; page 93; Section D.6 including pages 100-102 teaches that (1) there are three passes: cleanup, significant propagation, and magnitude refinement and (2) data associated with significant propagation pass and magnitude refinement pass higher than fifth significant bit plane are not arithmetically coded. Raw bits are sent directly.)

-- wherein coefficient data from bit-planes p<po-K are written directly into the encoded bit-stream without arithmetic coding, wherein po denotes the most significant bit-plane of the code block in which any sample therein becomes contextually significant during arithmetic coding and K is an integer parameter, wherein K includes 3; (annex D; page 93; The first bit-

plane po is the most significant bit-plane with a non-zero element. Table D-9 teaches a case of K=3. For example if the most significant bit is bit #8. The #1, 2, 3, 4, and 5 passes shown in Table D-9 corresponding to coding bit #8, 7, 6, 5, and 4, respectively. So po=8. When K=3, any bit# smaller than 5 (=8-3) is written directly. Therefore, bit#4 corresponding pass #5 is written directly. Table D-9 shows that raw data associated with #5 significant propagation pass and magnitude refinement pass are written directly.)

-- wherein the method for compressing image data is based on embedded block coding with optimized truncation and employs a wavelet transform. (Fig. 6-1; Annex F teaches wavelet transform. Section D 4.2 including page 100 teaches the embedded block coding with optimized truncation. The embedding property is associated with the priority of data stream associated with each bit plane.)

JPEG 2000 also teaches a system to implement the method of Claims 1-5. (sections 6.3 and 7, pages 9-11) An encoder is an embodiment of the above-discussed encoding process. Therefore, the JPEG 2000 system also teaches the systems recited in Claim 6-10.

b. With regard to Claim 12, JPEG 2000 also teaches that

-- wherein arithmetically coded (AC) bit-plane data is interleaved with the bit-plane coefficient data included in the bit-stream without arithmetic coding. (Table D-9 in page 101 teaches that the interleaving existed from pass #4 to pass #5 to final pass as shown in alternating of "AC" and "raw" symbols in Table D-9.)

c. With regard to Claims 13-18, JPEG 2000 teaches method for compressing image data, comprising the steps of:

-- decomposing the image data into code-blocks of coefficients using a transform, each code-block comprising a plurality of bit-planes from a most significant bit-plane to a least significant bit-plane; (sections 6.3 and 7, pages 9-11; sections B.6 and B.7, pages 60-61; annex D)

-- processing bit-planes of coefficient data in the code blocks in multiple coding passes to generate raw bit-plane data; (annex D; page 93; Section D.6 including pages 100-102 teaches that there are three passes: cleanup, significant propagation, and magnitude refinement.

-- arithmetically coding a portion of raw bit-plane data to generate arithmetically coded data; (annex D; page 93; Section D.6 including pages 100-102 teaches that data associated with passes with #1-4, corresponding most-significant-bits, are arithmetically coded.)

-- writing the arithmetically coded data and the raw bit-plane data not arithmetically coded directly into a bit-stream; (annex D; page 93; Section D.6 including pages 100-102 teaches that data associated with significant pass and magnitude refinement passes higher than fifth significant bit plane are not arithmetically coded. Data from passes 1, 2, 3, 4, 5, ...final of Table D-9 are written into a stream.)

-- wherein raw bit-plane data generated during at least one coding pass for a prescribed class of bit-planes is written directly into the bit-stream; (annex D; page 93; Section D.6 including pages 100-102 teaches that raw data associated with significant pass and magnitude refinement passes higher than fifth significant bit plane are not arithmetically coded. They are written directly into bit-stream.)

-- -- wherein raw bit plane data generated during at least one coding pass for bit-planes p<po-K is written directly into the encoded bit-stream, wherein po denotes the most significant bit-plane of the code block in which any sample therein becomes contextually significant during arithmetic coding and K is an integer parameter, wherein K includes 3; (annex D; page 93; The first bit-plane po is the most significant bit-plane with a non-zero element. Table D-9 teaches a case of K=3. For example if the most significant bit is bit #8. The #1, 2, 3, 4, and 5 passes shown in Table D-9 corresponding to coding bit #8, 7, 6, 5, and 4, respectively. So po=8. When K=3, any bit# smaller than 5 (=8-3) is written directly. Therefore, bit#4 corresponding pass #5 is written directly. Table D-9 shows that raw data associated with #5 significant propagation pass and magnitude refinement pass are written directly.)

-- wherein the method for compressing image data is based on embedded block coding with optimized truncation and employs a wavelet transform; (Fig. 6-1; Annex F teaches wavelet transform. Section D 4.2 including page 100 teaches the embedded block coding with optimized truncation. The embedding property is associated with the priority of data stream associated with each bit plane.)

-- wherein arithmetically coded (AC) bit-plane data is interleaved with the bit-plane coefficient data included in the bit-stream without arithmetic coding. (Table D-9 in page 101 teaches that the interleaving existed from pass #4 to pass #5 to final pass as shown in alternating of "AC" and "raw" symbols in Table D-9.)

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-10 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (pages 2-3, last paragraph in page 7) in view of Schwartz et al. (US patent 5,815,097 cited in IDS) and Budge et al. (US Patent Application Publication 2002/0080408 cited in IDS.)

a. With regard to Claims 1-10, the admitted prior art (pages 2-3) disclosed the JPEG 2000 algorism that teaches method and system for compressing image data, comprising the steps/components for:

-- decomposing the image data into code-blocks of coefficients using a transform, each code-block comprising a plurality of bit-planes from a most significant bit-plane to a least significant bit-plane; (page 3)

-- forming an encoded bit-stream by coding bit-planes of coefficient data in the code-blocks according to an arithmetic coding scheme in order to form an encoded bit-stream; (page 3)

-- wherein the arithmetic coding scheme operates in a plurality of coding passes; (page 3; Each coding of a bit plane is a pass.)

-- wherein the method for compressing image data is based on embedded block coding with optimized truncation and employs a Wavelet transform. (The last paragraph in page 7 of the present specification admitted that EBCOT is a prior art as published in the document N 1020R on 10/21/1998.)

The system cited in JPEG 2000 Image Coding System document (page 2) implicitly teaches all components to implement the above features.

However, the admitted prior art does not teach the feature that " coefficient data from at least one bit-plane is included in the encoded bit-stream without arithmetic coding."

Schwartz teaches a compression system and method:

-- wherein coefficient data is included in the encoded bit-stream without arithmetic coding. (The passage in column 9, lines 23-43 teaches: "For predictive coding data, some of the data can be assumed to be 50% random data and simply copied to/from the compressed data without needed entropy coding, thereby reducing the entropy coding operations and allowing hardware to operate at faster speeds." The passages in column 11, lines 37-53 and column 13, lines 12-32 teaches that data are passed to manager 1207 without arithmetic coding.)

Budge teaches that the k least significant bits of a sequence of N-bit data are randomly distributed. (section 0065)

It is desirable for reducing the entropy coding operations and allowing hardware to operate at faster speeds. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply the teachings of Schwartz and Budge to bypass arithmetic coding of the K least significant bit-planes of the data, which are randomly distributed, taught in the admitted prior art, because the overall combination provides an advantage of reducing the entropy coding operations. Accordingly, the combination teaches:

-- wherein the arithmetic coding scheme operates in a plurality of coding passes, and wherein at least one of the arithmetic coding passes for the coefficient data from said at least one bit-plane is not performed during the image data compression;

-- wherein coefficient data from bit-planes p<po-K are written directly into the encoded bit-stream without arithmetic coding, wherein po denotes the most significant bit-plane of the code block in which any sample therein becomes contextually significant during arithmetic coding and K is an integer parameter; (In the combination, the N-K bit-planes are arithmetic coded.)

- wherein K includes 3, (It is well known that a pixel usually has 8 bits. Schwartz teaches in column 11, lines 21-27 that three or four entropy coding operations are performed on the amplitude data.)

The combinations as cited above also teach the system Claims 6-10.

b. With regard to Claim 12, because (1) each code-block taught in the admitted prior art is coded and transmitted one by one and (2) the combination teaches coding each code-block with and without arithmetic coding, the combination also teaches the feature that arithmetically coded bit-plane data is interleaved with the bit plane coefficient data included in the bit-stream without arithmetic coding.

c. With regard to Claims 13-18, the admitted prior art (pages 2-3) disclosed the JPEG 2000 algorism that teaches method and system for compressing image data, comprising the steps/components for:

-- decomposing the image data into code-blocks of coefficients using a transform, each code-block comprising a plurality of bit-planes from a most significant bit-plane to a least significant bit-plane; (page 3)

-- processing bit-planes of coefficient data in the code blocks in multiple coding passes to generate raw bit-plane data; (page 3; block 22 of Fig. 1; Each coding of a bit plane is a pass.)

-- coding bit-planes of coefficient data in the code-blocks according to an arithmetic coding scheme in order to form an encoded bit-stream; (page 3)

-- wherein the arithmetic coding scheme operates in a plurality of coding passes; (page 3; block 22 of Fig. 1.)

-- wherein the method for compressing image data is based on embedded block coding with optimized truncation and employs a Wavelet transform. (The last paragraph in page 7 of the present specification admitted that EBCOT is a prior art as published in the document N 1020R on 10/21/1998.)

The system cited in JPEG 2000 Image Coding System document (page 2) implicitly teaches all components to implement the above features.

However, the admitted prior art does not teach the recited features related to (1) "the step of coding a portion of raw bit-plane data" and " the step of writing coded data and raw data not arithmetic coded into a bit-stream."

Schwartz teaches a compression system and method:

-- wherein coefficient data are included in the encoded bit-stream without arithmetic coding in which portion of raw data is arithmetically coded and the other is not arithmetically coded and directly output to an output bit-stream. (The passage in column 9, lines 23-43 teaches: "For predictive coding data, some of the data can be assumed to be 50% random data and simply copied to/from the compressed data without needed entropy coding, thereby reducing the entropy coding operations and allowing hardware to operate at faster speeds." The passages in column 11, lines 37-53 and column 13, lines 12-32 teaches that part of data are passed to manager 1207 without arithmetic coding.)

Budge teaches that the k least significant bits of a sequence of N-bit data are randomly distributed. (section 0065)

It is desirable for reducing the entropy coding operations and allowing hardware to operate at faster speeds. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply the teachings of Schwartz and Budge to bypass arithmetic coding of the K least significant bit-planes, which are randomly distributed, of the data taught in the admitted prior art, because the overall combination provides an advantage of reducing the entropy coding operations. Accordingly, the combination teaches:

-- arithmetically coding a portion (the most-significant-bit bit-planes) of raw bit-plane data to generate arithmetically coded data;

-- writing the arithmetically coded data and the raw bit-plane data not arithmetically coded (K least-significant-bit bit-planes) directly into a bit-stream, wherein these two data are interleaved; (Because (1) each code-block taught in the admitted prior art is coded and transmitted one by one and (2) the combination teaches coding each code-block with and without arithmetic coding, the combination also teaches the feature that arithmetically coded bit-plane data is interleaved with the bit plane coefficient data included in the bit-stream without arithmetic coding.)

-- wherein raw bit-plane data generated during at least one coding pass for a prescribed class (the class of least-significant-bit bit-planes) of bit-planes is written directly into the bit-stream;

-- wherein raw bit plane data generated during at least one coding pass for bit-planes $p<po-K$ is written directly into the encoded bit-stream, wherein po denotes the most significant bit-plane of the code block in which any sample therein becomes contextually significant during arithmetic coding and K is an integer parameter; (In the combination, the N-K bit-planes are arithmetic coded in the amplitude coding pass.)

- wherein K includes 3. (It is well known that a pixel usually has 8 bits. Schwartz teaches in column 11, lines 21-27 that three or four entropy coding operations are performed on the amplitude data.)

Double Patenting

8. Claims 1-5 and 12-18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,658,159 as discussed below. Although the conflicting claims are not identical, they are not patentably distinct from each other because the following reason.

Claims 1-3 of the present application are anticipated by Claim 1 of U.S. Patent No. 6,658,159.

Claims 4, 5, and 12 of the present application are anticipated by Claims 2, 3, and 4 of U.S. Patent No. 6,658,159, respectively.

Claims 13-15 of the present application are anticipated by Claim 5 of U.S. Patent No. 6,658,159.

Claims 16-18 of the present application are anticipated by Claims 6-8 of U.S. Patent No. 6,658,159, respectively.

Anticipation is a clear form of obviousness.

9. Claims 6-10 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of U.S. Patent No. 6,658,159 in view of JPEG2000 cited above.

Claims 6-10 of the present application are the corresponding system claims of Claim 1-5. As discussed above, Claims 1-4 of U.S. Patent No. 6,658,159 teach obviously the methods associated with Claims 6-10 of the present application.

However, Claims 1-4 of U.S. Patent No. 6,658,159 do not claim systems.

JPEG2000 teaches a system to implement the methods the same as the methods associated with Claims 6-10 of the present application.

It is desirable for put a method into practice with a system. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply the system taught by JPEG2000 to implement the methods of claims 1-4 of U.S. Patent No. 6,658,159, because the combination puts the methods of claims 1-4 of U.S. Patent No. 6,658,159 into practice. Accordingly, the combination teaches Claims 6-10 of the present application.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 571-272-7431. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 571-273-8300 for After Final communications. TC 2600's customer service number is 571-272-2600.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Wenpeng Chen
Primary Examiner
Art Unit 2625

December 8, 2005